Docket No. 0756-1551

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6/7/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)
Shunpei YAMAZAKI et al.)
Serial No. 08/691,434)
Filed: August 2, 1996)
For: METHOD OF FABRICATING)
SEMICONDUCTOR DEVICES)
AND APPARATUS FOR)
PROCESSING A SEMICONDUCTOR)

Art Unit: 2822
Examiner: M. Wilczewski

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with The United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231, on 5/15/02

RESPONSE

Honorable Commissioner of Patents
Washington, D.C. 20231

Sir:

The Official Action mailed January 15, 2002 has been received and its contents carefully noted. Filed concurrently herewith is a *Petition for One Month Extension of Time*, which extends the period for response to May 15, 2002. Thus, it is respectfully submitted that this response is timely filed.

Claims 16-20, 24, 25, 56-61 and 74-91 are pending in the present application. The Official Action rejects claims 16-20, 24, 25, 80 and 86 as obvious based on the combination of Begin et al., Miyachi et al., Kawasaki et al., Codama, Pressley, and Kawachi et al. The Official Action further rejects claims 56-61, 81 and 87 as obvious based on the combination of Begin et al., Miyachi et al., Nakayama et al., Kawasaki et al., Hashizume, and Kawachi et al. Finally, the Official Action rejects claims 74-79, 82-85 and 89-91 as obvious based on the combination of Begin et al., Miyachi et al., Nakayama et al., Kawasaki et al., Codama, and Kawachi et al.

Applicant respectfully traverses these rejections. The present invention relates to an apparatus for processing a semiconductor. The apparatus of the present invention comprises a vacuum chamber, an ion introducing apparatus and a light processing apparatus having a light processing chamber. The light processing chamber of the light

processing apparatus is connected to the ion introducing apparatus through the vacuum chamber. A dopant impurity is doped into a semiconductor layer provided over a substrate in the ion introducing apparatus. Thereafter, the semiconductor layer is irradiated with a light, such as a laser light or an infrared light, in the light processing chamber.

In the present invention, the vacuum chamber is provided with a mechanism for transporting the substrate provided with the semiconductor layer thereover from the ion introducing apparatus to the light processing chamber without exposing the substrate to air. Because the substrate provided with the semiconductor layer thereover is transported without exposing the substrate to air, pollution of the semiconductor layer by air and external impurities is prevented. Therefore, when the semiconductor layer enters the light processing chamber, the semiconductor layer is doped with the dopant impurity and is prevented from being doped with various impurities from the air and external impurities.

In the light processing chamber, a light such as laser light or an infrared light is irradiated to the semiconductor layer to activate the dopant impurity doped in the semiconductor layer. Because the semiconductor layer is free from various impurities from the air and external impurities when the laser light or infrared light is irradiated to the semiconductor layer, the semiconductor layer is not influenced by the various impurities from the air and external impurities. As a result, a conductivity of a part of the semiconductor layer doped with the dopant impurity is not influenced by the various impurities. That is, with the present invention, control of the conductivity of the part of the semiconductor layer doped with the dopant impurity is improved.

As stated in MPEP § 2143-2143.01, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some

teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab,* 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

As stressed in Applicant's previous response, it is respectfully asserted that the Official Action has failed to establish a *prima facie* case of obviousness. The cited prior art of record, alone or in combination, fails to recognize the advantage achieved by the present invention, namely improvement in the control of the conductivity of the part of the semiconductor layer doped with the dopant impurity. This advantage is realized by the present invention as described above, wherein exposure of the semiconductor layer to air or external impurities is avoided.

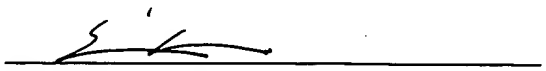
It is respectfully submitted that the Official Action has failed to show sufficient motivation to combine the references to achieve the present invention. In the *Response to Arguments*, the Official Action asserts that Applicants have failed to indicate with sufficient specificity where the lack of motivation in the rejection is found. In response, it is submitted that the burden of showing sufficient motivation to combine references lies with the Office. MPEP § 2142 states "The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness. If, however, the examiner does produce a *prima facie* case, the burden of coming forward with evidence or arguments shifts to the applicant who may submit additional evidence of nonobviousness, such as comparative test data showing that the claimed invention possesses improved properties not expected by the prior art. The initial evaluation of *prima facie* obviousness thus relieves both the examiner and applicant from evaluating evidence beyond the prior art and the evidence in the specification as filed until the art has been shown to suggest the claimed invention."

It is respectfully submitted that the Official Action has failed to carry this burden. While the Official Action relies on various teachings of the cited prior art to disclose aspects of the claimed invention and asserts that these aspects could be used together, it is submitted that the Official Action does not adequately set forth why one of skill in the art would combine the references to achieve the present invention. MPEP § 2142 further states: "The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. 'To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.' *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985)."

In the present application, it is respectfully submitted that the prior art of record, alone or in combination, fails to expressly or impliedly suggest the claimed invention and the Official Action has not presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. Reconsideration is respectfully requested.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,



Eric J. Robinson
Reg. No. 38,285

Robinson Intellectual Property Law Office, P.C.
PMB 955
21010 Southbank Street
Potomac Falls, Virginia 20165
(571) 434-6789